Shrinikethan Layout (BDA Layout).

## CT OF ESTIMATES, RATE ANALYSIS, ESTIMATES & BILL OF QUANTITY (BOQ)

**Project Cost = 5.50 Crores**

**SEASON : JULY - 2020**

**NEZ INFRATECH PRIVATE LIMITED**

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# Detailed Report

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A quick view of the existing condition of the project road is illustrated in the Table 1-2 below.

**Table 1-2 Existing road condition details**

| Sl No | Description | Information | Page No. |
|---|---|---|---|
| 1 | Length of Road | 655 m | 19 |
| 2 | Existing Right of way | 9.42m to 12 m | |
| 3 | Existing width of road | 6.02m to 7.18m | |
| 4 | Single lane/Two lane | Single lane with Two way Traffic | |
| | Vehicles per day- 0 TO 655 | 31140 / 59644PCU | |
| | Road type from 0 to 655 | Bitumen road | |
| | Boundary on either side of road CH: 0 to CH:655 | Private /open Land | |
| | Religious Places | Nil | |
| | Drain 0 to 655 | RCC LHS | |
| 0 | Land acquisition 0 to 655 | Private Land/Properties | |
| | Tree existing & Cutting for widening | 41 Nos | |
| 2 | Major Junction | 1 Nos | |

## 3 Improvement proposal

The improvement proposal detailed in the Chapter -6 is summarized in the Table 1-3 below - Quick review.

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**Table 1-3 Improvement Proposal of the Project Road**

| Sl No | Description | Information | Page No. |
|---|---|---|---|
| 1 | Length of Road | 655 m | 57 |
| 2 | EROW from CH 0 to CH 655 | 9.42 to 12m | |
| | PROW from CH 0 to CH 655 after acquisition of Private Land | CH 0 to 655= 12m, | |
| | As per BDA RMP-2015 Ch 0 to 655 | CH 0 to 655= 12m, | |
| | Road Widening from CH: 0+000 to CH:655 | 12 m | |
| | Type of road proposed | Bitumen Road | |
| | Thickness, Length & width of Bituminous Road proposed from CH: 0+000 to CH:655 | 30mm BC/50mm/DBM/250mm WMM/150 mm GSB/200mm Subgrade, | |
| | Road widening from CH: 850 to CH:655 | Widening on either side | |
| | Dismantling of RCC Drain /Buildings for Road widening | Ch 0 to 655 & Residential/Commercial Buildings on either sides | |
| | New RCC Drain proposed | Ch 0 to 655 | |
| | Proposal of Utility duct cum Foot path from CH: 0+000 to CH:655 | Provision is made for Utility duct cum Footpath | |
| | Proposal of Drain and Footpath from CH:0 to CH:655 | Foot path cum Utility duct & Drain | |

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| | | |
|---|---|---|
| work for Excavation & Subgrade ( Bill No. 2 ) | 18,29,574.97 | 4.08 |
| crete of all grade and Steel Work for Drain, Manhole, Basement for Street Pole ( Bill No. 3 ) | 1,68,83,378.08 | 37.63 |
| Base work for GSB & WMM ( Bill No. 4 ) | 70,06,594.59 | 15.62 |
| onry and Finishing works for Footpath, Kerb, utility Duct etc ( Bill No.5 ) | 1,01,22,136.42 | 22.56 |
| e and Surface work for DBM & BC ( Bill No. 6 ) | 61,92,919.94 | 13.80 |
| ement marking and Road Appurtenances ( Bill No. 7 ) | 4,71,647.69 | 1.05 |
| struction of Recharge pits for Rain water Harvesting ( Bill No. 8 ) | 1,42,619.79 | 0.32 |
| Plantation and Transplantation ( Bill No. 9 ) | 15,26,735.28 | 3.40 |
| **Amount Put to Tender = Sub Total A** | **4,48,63,139.59** | **100.00** |
| **Add GST 12 % on Sub Total A = Sub Total B** | **53,83,576.75** | |
| vision for Consultancy service for preparation of Detailed project Report R) including Topographical survey using Drone implementing LiDAR nology, Road & Structure inventary, Carrying out Geo technical estigation, Traffic Survey, Falling Weight Deflectometre (FWD). | 4,85,000.00 | |
| vision for Tender premium of 5% on Sub Total A | 22,43,156.98 | |
| vision for GST of 12% on Tender premium (Sl. No 14) | 2,69,178.84 | |
| vision for Consultancy service for Project Management, Validation of DPR, nstruction support, issue of good for constuction drawings, Preparation of tailed Land Acquisition Plan & Schedule, by adopting Aerial Survey using one / UAV implementing LiDAR technology, Joint Measurement Survey MS), Preparation of Alignment Registers and documents for Processing TDR per the standard of BBMP Revenue Department | 17,55,947.84 | |
| Sub Total C | 47,53,283.66 | |
| Grand Total for the Project = ( Sub Total A+B+C ) | 5,50,00,000.00 | |
| Rupees Five Crore Fifty Lakhs On | | |

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Bangalore is one of the fastest growing cities in the world and its growth is rel
pleasant climate, resource availability, pleasant manner and its tradition. Provi
needs, keeping the city clean and maintaining a calm climate is a major conce
authorities.

The absence of natural barriers has encouraged the turbulent stretches of the
directions. The extraordinary increase in population, the uninterrupted expansion
and the high concentration of economic activity has led to a sudden increase in th
of motor vehicles using the road system.

The limited road space available is suffocating day by day. The rise of comm
industrial activities has added additional demand to the existing road-based urban
system. The lack of mass transit and other related facilities has led to an alarmin
in personalized mode.

The Project Singapura Garden road was a former City Municipal Council. But,
officially merged to Bruhat Bangalore Mahanagara Palike. Dasarahalli is also an
Constituency after delimitation of Assembly constituencies.

The project road, which is an inner city of Access Streets, is very narrow with pr
on either sides, and the widening of the road should be taken into account to a
current situation.

## 2.2 Project Location

The Project road Singapura Garden Road in Dasarahalli presently under conside
widening is inner Access streets road of city and proximate to NH-4, Hesaragh
leads to ORR and Whitefield road. Location of Project Road is shown in Figu
Figure 2-2.

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**Figure 2-1 Route Map Showing Location of Project Road**

**Figure 2-2 Project Road Location Showing in Google Earth**



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ct;

revised Master Plan 2015 of BDA proposes programs and projects that could be emented for the geometric improvement of some roads in this Makalli district, ding the Singapura Garden Road from Abbigere Road (Precision Components Factory) rinikethan Layout (BDA Layout)

sarahalli in Jalahalli West is an upcoming locality in the northern part of Bangalore. It e of the beautiful places surrounded with lush greenery. Gangamma Circle is the ion between the roads connecting Jalahalli East-West-Cross intersects. The National emy of Customs and Narcotics, Bangalore is located in this area. The east region of ocale boasts Jakarbandi State Forest. Top companies like Bharat Electronics Limited ), Hindustan Machine Tools (HMT), CMTI and other PSUs exist here. The presence ivate industries, including Bharat Fritz Werner Ltd (BFW), the packaging unit of Tata Ltd and other small-scale industries has attracted many working people to settle in and nd this area. Jalahalli East Air force station is situated between MS Palya and gamma Circle.

chosen project road is a narrower road and has inadequate width of carriageway for ement of traffic. Road widening is necessary to ease the traffic movement and to ease the traffic safety in the existing narrow road.

Karnataka Government has directed the BBMP to study the proposal for up ation/improvement of present existing main road of T Dasarahalli from Singapura den Road from Abbigere Road (Precision Components Factory) to Shrinikethan Layout A Layout) to de- congest the traffic and to have traffic safety as the development taken e in and around the city of Dasarahalli. Hence, a detailed planning report is required widening of Singapura Garden road for a length of about 655 m

MP has entrusted the work to prepare a detailed project report for this project road to. NEZ Infratech Pvt Ltd .The project report is prepared with the following details.

**Objective of the Study**

primary objectives of the study are:

1. Conduct necessary surveys and investigations to arrive for improvement of traffic movement by widening of this road.
2. Suggest an improvement scheme for widening of road to reduce traffic congestions and delays.
3. Prepare Cost Estimate and Bidding documents



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lan with entry exist mapping
dentification of existing utility lines on survey drawing
Design of alignment,median,kerbs,driveway and pedestrian walk way/side walk
Pavement evaluation and design of pavement
Proposal for Relocation of utilities and provision for utility ducts
x. Proposal for pedestrian subway/skywalks
Cost Estimation and Bill of Quantities
Action plan for implementation and completion of project.
Power Point Presentation, meetings and discussions on the project at various levels
Preparation of Technical Specifications and tender documents

Detailed Project Report including above scope of work has been prepared as part of the scope.

**Broad Methodology**

Below are the broad methods adopted in the present study to arrive at a viable solution for widening the road to improve traffic the flow.

Study the existing traffic flow.
Study traffic turning movements at the junction location.
Access existing utilities in the project area in planning alignment.
Design of road to improve the traffic
Quantity and Cost estimate for the widening scheme.

**Deliverables**

As part of a detailed project report, the following are proposed to be submitted according to TOR's reporting.

**VOLUME -I: Main Report**

Chapter 1: Key Features and Summary of the Project Report

Chapter 2: Introduction

Chapter 3: Surveys and Investigations

Chapter 4: Traffic Surveys and Analysis

Chapter 5: Design Standards.

Chapter 6: Improvement Proposals



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(iii) Road Profile Plan

(iv) Typical Cross Sections

(v) Standard Drawings

a. Typical Details of Drain

b. Sign Boards

c. Lane Marking d. Miscellaneous Details

**VOLUME –III:** Specifications and Tender Document

## 3 Survey and Investigation

### 3.1 General

The prescribed engineering surveys and investigations have been carried out on the Project Road conforming to MORTH/IRC/BIS Specifications /Tender sure Guidelines /Codes as per TOR to generate adequate database for preparing the most appropriate widening proposal of project road. As part of the study, consultants carried reconnaissance; inventory, traffic surveys, pavement condition surveys, BBD surveys and secondary data collection at above mentioned roads. These surveys have been carried out on the Project corridors in the month of June/July 2020 to assess the adequacy and effectiveness of existing pavement in serving the present and future traffic needs. The Study and Investigations will be conducting in accordance with the Scope of Work entrusted to the Consultants. Following are the various engineering surveys and investigations other than traffic surveys. The scope of works includes but not limited to:

- Field Reconnaissance (Road Inventory).
- Road Inventory and Condition Survey (Visual Observation).
- Pavement Structure and Strength (BBD Survey).
- Topographic Survey.

The consultants visited the site along with BBMP authority accompanied by concerned Executive engineer and with his team to acquaint the site and to study the various site related constraints which should be kept in mind while preparing the various alternative solutions for widening of road to improve the traffic flow.

### 3.2 Field Reconnaissance Survey

The consultants have made a study of the available land width (ROW), topographic survey maps of the project area and other relevant information collected. A detailed reconnaissance survey has been conducted on the total section of the project road and an assessment of possible alignment change at places, if required, has also been made. Detailed features such as land-use, habitation, water routes, intersecting roads, utilities such as OFC Cables,



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## Road Inventory Survey

The purpose of the road inventory survey was to record the essential road elements and features of the project road along the existing alignment. The inventory survey was carried out by visual inspection (walking) and measuring the elements along the entire project road at every 50m interval. Inventory survey details collected is presented in Table 3 1 and Inventory photos are shown in Figure 3 1

**Table 3-1 Road Inventory Survey for Singapura Road**

| Chainage | | Terrain | Land Use | ER/DR | Carriage way Drain to Drain (M) | | Median width/ Type | Road Drainage LHS (M) | | Road Drainage RHS (M) | | Foot Path LHS (M) | | Foot Path RHS (M) | | Utility Type | | Intersection Type | Remarks (Details Information) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| From | To | | | | Width | Type | | Width | Type | Width | Type | Width | Type | Width | Type | LHS | RHS | | |
| 0 | 50 | P | C,R | 10.82 | 6.27 | BT | No median | 0.6 | RCC | Nil | | Nil | | Nil | | | | 1 | |
| 50 | 100 | P | C,O,R | 12.32 | 6.21 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | | |
| 100 | 150 | P | C,O,R | 12.17 | 6.58 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | Culvert | | | |
| 150 | 200 | P | C,O | 13.06 | 6.15 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 1 | |
| 200 | 250 | P | O | 12.33 | 6.33 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 1 | |
| 250 | 300 | P | O,R | 10.16 | 7.2 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 1 | |
| 300 | 350 | P | O,R | 9.87 | 7.07 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 1 | |
| 350 | 400 | P | O,R | 9.42 | 6.09 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | | |
| 400 | 450 | P | O,R | 10.49 | 6.32 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | | |
| 450 | 500 | P | O | 12.07 | 7.11 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | | |
| 500 | 550 | P | O | 12 | 7.08 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 3 | |
| 550 | 600 | P | O | 11.3 | 6.81 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 1 | |
| 600 | 650 | P | O,R | 11.38 | 6.3 | BT | -do- | 0.6 | RCC | -do- | | -do- | | -do- | | | | 2 | |

**Terrain:** P Plain R Rolling H Hilly **Land Use** B Built up O Open Land I Industrial R Residential C Commercial **Surface Type** BT Bitum top CC Cement concrete Kathan
**Intersection Type** 3 3Armed 4 4 4Armed 5 5Armed 6 6Armed **Structure** C Culvert B Bridge ROD Road over Drain ROBR Road overbride Bridge



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ventory on Singapura Garden

Thin Bitumen surface on Singapura Garden road

les at Ch 400 near private estate

Pot holes at end change 655

**Figure 3-1 Photos Taken during Road Inventory for Abbigere Main Road**

**Road Condition Survey:**

iled field studies have been carried out to collect pavement, footpath, and drainage tions. Table 3-3 below shows the details of pavement condition survey, the related s taken during the road condition, are shown in Figure 3-2 below.

ment condition survey was carried out for the project roads. From the survey it is rved that the overall road surface of Singapura Garden road is in poor condition with ment cracking, potholes, patching and raveling. Cracks or distress has been noticed at y sections. Percentage cracking is 2% ,patching about 20% and raveling of about 35%.



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| | L | A | % In area | Length |
|---|---|---|---|---|
| Pavement cracking | 110.50 | 90.65 | 1.33 | 13.00 |
| Potholes | | 0.02 | 0.00 | |
| Patching | 165.50 | 1208.75 | 17.78 | 19.47 |
| Ravaling | 345.00 | 2235.00 | 32.87 | 40.59 |

**Table 3-3 Road Condition Survey for Singapura Road**

Cracked surface at Ch 500

Existing width of Carriageway at ch 450

**Figure 3-2 Photos Taken during Road Condition Survey for Singapura Road**



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breaking. It is also observed [illegible] Surface of the main road is with thin bituminous
ined without rectification/repairs. Surface of the main road is with thin bituminous
velled at many places needs to be re-laid from the sub base course. Hence survey
been carried out.

### tructural Inventory Survey

ect road of length 655 m has structures like small Culverts at Ch 100 m near with 2
2m with height of 1.3m stone masonry structure and is in poor condition.

### etailed Topographic Survey

e: The basic objective of the topographic survey is to collect the essential ground
along the project corridors. The data collected will be useful for the detailed design
the computation of quantities. The topographic survey work consists of
issance survey, establishing DGPS points, fixing of BM pillars, horizontal
ng, vertical traversing, leveling and detailed topographical survey to capture all
preparation of drawing and submission of report.

, the survey team has to visit the whole area to be surveyed to understand the actual
conditions prevailing in the corridor and to assess the logistic. Based on this survey,
e survey teams will be mobilized for fixing of control pillars, for traversing, leveling
detail survey.

### ments to be used for Topographical Survey

opographic survey is undertaken by Total Station and GPS to develop a Digital
Model (DTM). The consultants being fully aware of the high standards aimed at for
preparation and propose the use of the following latest instruments of high accuracy.

### l Global Positioning System

asic plan control points (Primary Points) will be established by dual frequency GPS
vation, using Leica GS08 Plus static Glonass with RTK/ Promark DGPS with static,
ding a pair of primary control points along the proposed road section on permanent
nce pillars.

### Stations

Total stations of Leica TS06/ Nikon DTM 652 of 1sec accuracy and/or Nikon DTM352/ Nikon Nivo/ Leica TC705/ Topcon GTS 235N of 5sec accuracy will be deployed for topographic survey work.



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The horizontal control points shall be fixed using Global Positioning System along the alignment. Control Pillar of size 30cm x 30cm x 60cm shall be cast in RCC of grade M15 with a nail fixed in the centre of the top surface. The reference pillar shall be embedded in concrete up to a depth of 45 cm with PCC M10 (15 cm wide all around). The portion above ground shall be painted yellow. The spacing shall be 5km apart.

Bench Mark pillar of size 15cm x 15cm x 45cm shall be cast in RCC of grade M 15 with a nail fixed in the center of the top surface. The reference pillar shall be embedded in concrete up to a depth of 30cm with CC M10 (5cm wide all around), the balance 15 cm above ground shall be painted yellow. The spacing shall be 250m apart in straight alignment. The final RL (w.r.to GTS) and BM No. will be marked on the reference/BM pillars with red paint.

**Horizontal Traverse**

The co-ordinate system for the survey will be based on the Global Positioning System. The traversing will be started using the GPS co-ordinates and carried out the traversing using the reference pillars and nail points. The whole stretch is divided into different divisions to make horizontal traverse loops to have checks and counter checks for the traverse work. Each division of loop consists of 3 to 5 km stretch. Each horizontal loop will have the accuracy of more than 1:20,000, which satisfies minimum requirements.

**Leveling Loops** The leveling loop line was carried out using Auto level instrument (Sokkia C31) and the reduced levels of GPS and Traverse Station using the control pillars and nail points. Double run leveling was carried out along smaller circuits of 3 km – 5 km lengths ensuring the required accuracy within the tolerance limit of 12K mm, where K is the length covered in km.

**Detailed Topographical Survey**

After finalizing the X, Y and Z values based on the horizontal and vertical traverse loops, the detailed topographical survey is carried out capturing all the existing features. The survey is extend a minimum 30m beyond either side of centreline of proposed carriageway or land boundary whichever is more. For the 4-laning/6-laning project and intersections, the



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from existing road edge.

rcial establishments with names on either side of existing road.

onal institution, Hospitals, religious places, grave yard, etc with details, distance from road etc on either side of road. The details shall include n of entrance, compound walls/boundary lines, no of beds in case of hospital,

d forest area including fencing including boundary extents.

ication of all cross drainage structures (Bridges & culverts) – levels and s of headwall / return wall, width of deck across road, Deck top, deck bottom, spans, skew angle, direction of flow, width of piers / abutment, pipe no and dia e of pipe culverts, invert levels of culverts, cross section of stream at every or a length of 200m both on u/s and d/s for minor streams and at every 150m ength of 600m on u/s & d/s for major rivers.

fication of RoB/RUB – levels at road level, top of rail, extents of headwall / return width of deck, Deck top, deck bottom, no of spans, skew angle, railway chainage km, e number.

hotos captured during the survey are shown in

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Figure 3.4 Photo showing the existing crust of Pavement

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kelman Beam Deflection tests or rebound deflection tests were not conducted along the ect road since the existing road is completely weakened in strength due to poor rade , subcase and base course, improper densification, potholes, patchworks, existing he present road which requires re construction from subgrade to base course. Entire h of road is proposed for reconstruction with subgrade to base course.

**ffic volume counts**

traffic volume count surveys were conducted for Fifteen hours from morning 6am to ing 9pm to obtain classified count at the identified locations. The data was collected on king day by deploying enumerators to record data for each hour within fifteen minutes vals to obtain data on the magnitude of traffic flow, hourly variation and the traffic position. Analysis of survey datas are discussed in the chapter 4 Traffic survey and ysis

**Estimate and Bill of Quantities**

rate of materials adopted in the preliminary cost estimate are based on the basic rates of ataka PWD, Bengaluru Circle S.O.R. 2018-19 and updated with respect to increase in c rates of Bituminous materials and as modified by the PWD for the items related to minous works, cement and steel are considered for estimate. For the working out of minary cost estimate, work items are split into the following sub-heads shown in the e 3-5

**Table 3-5 Main heads of Cost Estimates**



M/s. NEZ Infratech Pvt Ltd

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